Science and Technology – Grade 8 Understanding Life Systems (Cells)

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| **Culminating Activity: Cell Amusement Park** | | | Grade 8 |
| **Unit Overview:** Cells are the smallest unit of life. In this unit students have continued to develop their knowledge of organisms by focusing on the structures and functions of cell organelles in plants and animals. Through the use of microscopes students investigated cells to identify and explain the importance of various organelles within the cell. In this Culminating task students will show their knowledge of animal and plant cells by creating a cell amusement park brochure/map. Students then will need to persuade their audience into coming to their amusement park through a podcast presentation. Recommended number of classes (5 to 6). Students can work in partners for this activity or work individually.  **Overall Expectations (page 140):**  2. Investigate functions and processes of plant and animal cells;  3.Demonstrate an understanding of the basic structure and function of plant and animal cells and cell processes.  **Science Specific Expectations (page 141-142):**   |  |  | | --- | --- | | Relating Science and Technology to Society and the Environment | | | 1.1 | Assess the role of selected technologies in enhancing our understanding of cells and cellular processes |  |  |  | | --- | --- | | Developing Investigation and Communication Skills | | | 2.2 | Use a microscope correctly and safely to find and observe components of plant and animal cells (There will be slides available for students to take a look to get inspiration or ideas of the shape) | | 2.5 | Use appropriate science and technology vocabulary, including organelle, diffusion, osmosis, cell theory, selective permeability, membrane, stage, and eyepiece, in oral and written communication | | 2.6 | Use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes (e.g., using the conventions of science, make a labeled drawing of a cell; create a slide show to explain the results of investigations into the processes of osmosis and diffusion) |  |  |  | | --- | --- | | Understanding Basic Concepts | | | 3.2 | Identify structures and organelles in cells, including the nucleus, cell membrane, cell wall, chloroplasts, vacuole, mitochondria, and cytoplasm, and explain the basic functions of each (e.g., the nucleus holds all the information needed to make every cell in the body) | | 3.3 | Compare the structure and function of plant and animal cells | | 3.4 | Explain the processes of diffusion and osmosis and their roles within a cell (could be part of their explanation) | | 3.6 | Describe the organization of cells into tissues, organs, and systems (e.g., groups of cells with similar functions combine to make up tissues; groups of tissues with similar functions combine to make organs; groups of organs work together as organ systems)  *\*Note to Teacher\* This expectation will not be specifically addressed in the culminating task, however, will be addressed in the learning prior to the culminating task.* | | | | **Materials**  Microscopes with onion and fish slides prepared  Different Paper Sizes  Markers  Laptops if available or take students to computer lab  Audio Recording Software on computers  Power-point needs to be on computers  Animal/Plant Cell Posters  Culminating Activity Handout  Rubrics  Microphones |
| **Time: 45 Min Classes Assessment Opportunities** | | | |
| **Prior Knowledge** | Prior Knowledge that students need in order to complete this task:   * Differences in structures between animal and plant cells * The organization of cells in tissues, organs and organ systems * The function of membranes in cells * The reproduction of cells * The process of osmosis   Students should also be familiar with the following science and technology terminology: System, Organ, Tissue, Cell, Microscope, Organelles, Osmosis, Membrane, and Semi-Permeable. Students also need to have experiences with verbal presentations of their ideas. Finally, students need to have learned various advertising techniques and/or strategies to promote a product and target a certain audience (This would have been introduced in the Grade 7 Language Arts Curriculum and extends into the Grade 8 Language Arts Curriculum.) | Prior to commencing the culminating task, a unit test will be given to students and used as a diagnostic form of assessment for the culminating task. | |
| **Introduction of Activity** | Students can work in partners to complete this task or work individually. Students will be working on majority of the assignment in class but can bring in research from outside of class to help them with their blue print of the theme park. Partners or individual students will come up and grab a popsicle stick from a mug at the front of the room. The number on their popsicle stick corresponds to the order they will be presenting their podcast to the class.  **Day 1:**  Set up classroom: One station with microscopes plus animal and plant cell slides. Students should already have experience using a microscope (Back Room). A second station with laptops set up (12 in total – Left Wall). Last station should be set up with posters of animals and plant cells – these posters need to show every organelle clearly ( Right Wall)  Students will come into class and pick up a culminating activity outline handout at the front of the room and go to their desk.  Introduce students to the culminating activity with a Scenario that can be found on their handout as well.  *A new entertainment company known as Cytoplasmic Fair has just bought out Canada’s Wonderland and would like to make the theme park more educational. The company has decided to open a new ground called “Cell Tour,” in order to get more students and parents out to their park. They want at least 5 to 8 of their rides to resemble parts of an animal or plant cell with the ride functioning similar to that of the actual organelles in a plant or animal cell. This entertainment company has hired you to prepare a blue print for their new rides and promote them through a visual presentation that is to be shown to all of Ontario. Blueprints, write ups, and visual presentations will be evaluated for certain criteria using a rubric. Instruct students to read the respective rubrics for each task in order to successfully complete this culminating task.*  Teacher will proceed to go through the expectations for the blue print and write up before students begin.  Tell students once the assignment is completed we will celebrate our activity by having a vote. The visual presentation/oral presentation of the blueprint that is most voted for by their class mates will get the opportunity to present it to all the grade 7’s and 8’s. *Students will be allowed to work on the visual presentation outside of class time and come prepared to present on their presentation date.*  After students are introduced to the culminating activity, students can decide whether to work individually or with a partner. Students then pick their presentation dates by coming up and taking a popsicle stick which has a number on it and start to brainstorm which organelles they would like to depict in their fair ground and start to plan the illustrations through the use of microscopes/posters/ textbook or computer. Students will be instructed to start their brainstorming handout. By the end of this day, students should have decided on which five organelles they would like to depict in their blueprint.  \*Note to Teacher\* Teachers can provide students with an example of a blueprint that demonstrates at least level three work. However, if showing examples, teachers should ensure the example is appropriate for their class. | Observation/Anecdotal notes can be taken to record which students are on task, using their time wisely, using microscopes correctly, and taking initiative to ask questions if having trouble. | |
| **Action!** | Day 2: Work Period  Students will continue to work on their blue print. By the end of this day students should have a rough copy of their blue print completed. After about 20 minutes of students working on their blueprint, stop them and go over the write up expectations.  Students will need to complete a write up - for each organelle students will write a paragraph on the description of their organelle and how their ride functions making connections to the actual organelle and its function. For each organelle, students need to state which type of cell (animal or plant) the organelle is from. Students will also need to write a paragraph describing how the microscope helped them draw their organelles and what benefits there are from using a microscope to understand organelles of a cell.  Blueprints and write ups may be handed in to the teacher for a formative assessment if students wish. This will give teachers a chance to see if students are on task, getting work completed, if there on the right track and give students feedback on what they can improve on to get a higher grade.  Day 3: Work Period/ Blueprint+ Write up Due  On this day, blueprints and write ups will be handed back to the students with descriptive feedback on whether they are on the right track and next steps students should pursue. By the end of this day, students should submit the final copy of their blueprint and write up to the teacher. Teacher will have these blue prints marked for students on Day 4 so students can incorporate their blue prints into their presentations if they wish.  Day 4: Oral Presentation Work Period/ Hand back Blue Prints  On this day, students will work on their visual presentations. Go over expectations for the oral presentations. If possible, teachers may decide to book laptops for the class or take students to a computer lab with microphones. During this period students will need to come up with a way of persuading their classmates to come to their fair ground. The fairground most voted on will present their fairground to all students.  Day 5/6: Oral Presentations + Journal  Student podcasts will be presented to the class. During student presentations, 5 different students per presentation will be asked to note down things their peer/peers did well and things they could improve on for next time. Teachers should collect these notes and use them as formative assessment and return it to the respective students so they may read them. After all presentations are complete, reflective journals will be assigned to the class. | Students should use the self-assessment checklists to receive feedback on their work.  Blueprints and write ups handed in to the teacher will be used as a formative assessment of students’ progress Project Rubric will be used for a summative evaluation of students’ blueprints and write ups to determine students’ understanding of animal/plant cell organelles and their respective functions  Student presentations will be assessed using a rubric and used as a summative evaluation of student learning. | |
| **Consolidate Debrief** | Once the culminating task is complete and presentations are done students will get the opportunity to write a short journal entry as to whether they enjoyed the assigned culminating task, what they did well, and if there are any changes they would make for next time. They must also include an opinion as to whether the activity helped them consolidate the information they learned over the course of the unit. | Formative Assessment of Journal Entry | |
| **Assessments** | Ability to describe/draw their organelles accurately  Creativity of rides  Explain functions of the organelles accurately  Visual Presentation/ Persuasiveness to get students to visit their fair ground |  | |
| **Differentiate** | Task can be differentiated for students of different learning abilities. Students on IEP for language arts (writing) can orally explain their rides instead of writing in detail how their ride functions, (teachers can write what students say). Students who don’t feel comfortable drawing have the choice of designing their ride on the computer or cutting out pictures from magazines. The visual presentation can be in any form including Podcast, Vodcast, Radio Show, News Report, Digital Storytelling, Powerpoint Presentation which allows students to compose their ideas in nontraditional ways. Also helps students who feel uncomfortable presenting in front of others a chance to record and present their ideas creatively. | | |
| **Cross Curricular** | Language Arts Oral Communication:  Overall Expectation: Use speaking skills and strategies appropriately to communicate with different audiences for a variety of purposes.  Specific Expectations:  1.4 (demonstrate an understanding of the information and ideas in increasingly complex and difficult oral texts in a  variety of ways)  2.1 (identify a range of purposes for speaking in a variety of situations, both straightforward and more complex, and explain how the purpose and intended audience might influence the choice of speaking strategies)  2.3 (communicate in a clear, coherent manner, using a structure and style appropriate to the purpose, the subject matter, and the intended audience)  2.5 (identify a range of vocal effects, including tone, pace, pitch, volume, and a variety of sound effects, and use them  appropriately and with sensitivity towards cultural differences to communicate their meaning)  Language Arts Writing:  Overall Expectation: Generate, gather, and organize ideas and information to write for an intended purpose & use editing, proofreading, and publishing skills and strategies, and knowledge of language conventions, to correct errors, refine expression, and present their work effectively; and audience.  Specific Expectations:  1.6 **(**determine whether the ideas and information they have gathered are relevant, appropriate, and sufficiently specific for the purpose, and do more planning and research if necessary)  2.3 (regularly use vivid and/or figurative language and innovative expressions in their writing)  3.1 (spell familiar words correctly)  3.7 (use a wide range of appropriate elements of effective presentation in the)  finished product, including print, script, different fonts, graphics, and layout)  3.8 (produce pieces of published work to meet identified criteria based on the expectations)  Visual Arts:  Overall Expectation: Produce two- and three-dimensional works of art that communicate a variety of ideas (thoughts, feelings, experiences) for specific purposes and to specific audiences, using a variety of art forms.  Specific Expectations:  (produce two- and three-dimensional works of art)  Students are also exposed to marketing strategies  The assignment will help them with their presentation skills, communication skills, and organizational skills (organization of rides on blue print). | | |
| **Reference** | Idea was taken from <http://www.siemensstemacademy.com/index.cfm?event=showResource&c=&resourceId=fdc6f8e9-1438-bbfa-6093-ac3bc44aaa65> – In this activity students have to make analogies for all organelles to all the rides and shops at an amusement park. For example the nucleus is compared to the central office, lysosomes compared to a bathroom, ribosomes is compared to park employees or cars in a parking lot. Our activity asks students to create actual rides that have an outline of an organelle and the ride functions similar to that of an organelle. | | |